

Claims

- [c1] An imaging system comprising:
A primary gradient coil assembly; and
A shield coil assembly connected in series to said primary gradient coil assembly, said shield coil assembly comprising:
a first gradient shield coil; and
a second gradient shield coil connected in parallel to said first gradient shield coil.
- [c2] An imaging system as in claim 1 further comprising
at least one additional gradient shield coil connected in parallel to said first gradient shield coil and said second gradient shield coil.
- [c3] An imaging system as in claim 1 wherein said first gradient shield coil has a resistance equal to said second gradient shield coil.
- [c4] An imaging system as in claim 1 wherein:
said first gradient shield coil comprises a plurality of first shield winding turns; and
said second gradient shield coil comprises a plurality of second shield winding turns, said plurality of second shield winding turns having the same number of turns as said plurality of first shield winding turns.
- [c5] An imaging system as in claim 1 wherein:

said first gradient shield coil comprises a plurality of first shield winding turns and a plurality of winding gaps, each of said plurality of winding gaps formed between consecutive turns of said plurality of first shield winding turns; and
said second gradient shield coil comprises a plurality of second shield winding turns, each of said plurality of second shield winding turns positioned within on of said winding gaps.

[c6] An imaging system as in claim 5 wherein said plurality of first shield winding turns and said plurality of second shield winding turns are positioned within a single winding plane.

[c7] An imaging system as in claim 1 wherein said shield coil assembly comprises a plurality of winding turns formed in an asymmetrical pattern.

[c8] An imaging system as in claim 1 wherein:
said first gradient shield coil comprises a plurality of first shield winding turns forming a first sub-coil;
said second gradient shield coil comprises a plurality of second shield winding turns forming a second sub-coil, said second sub-coil positioned linearly adjacent to said first sub-coil and position within a single winding plane.

[c9] An imaging system comprising:
A primary gradient coil assembly; and
A shield coil assembly surrounding said primary gradient coil

assembly, said shield coil assembly comprising:
a first gradient shield coil; and
a second gradient shield coil connected in parallel to said first gradient shield coil.

[c10] An imaging system as in claim 9 further comprising
at least one additional gradient shield coil connected in parallel
to said first gradient shield coil and said second gradient shield
coil.

[c11] An imaging system as in claim 9 wherein said first gradient
shield coil has a resistance equal to said second gradient
shield coil.

[c12] An imaging system as in claim 9 wherein:
said first gradient shield coil comprises a plurality of first shield
winding turns; and
said second gradient shield coil comprises a plurality of
second shield winding turns, said plurality of second shield
winding turns having the same number of turns as said
plurality of first shield winding turns.

[c13] An imaging system as in claim 9 wherein:
said first gradient shield coil comprises a plurality of first shield
winding turns and a plurality of winding gaps, each of said
plurality of winding gaps formed between consecutive turns of
said plurality of first shield winding turns; and

said second gradient shield coil comprises a plurality of second shield winding turns, each of said plurality of second shield winding turns positioned within one of said winding gaps.

[c14] An imaging system as in claim 9 wherein:
said first gradient shield coil comprises a plurality of first shield winding turns forming a first sub-coil;
said second gradient shield coil comprises a plurality of second shield winding turns forming a second sub-coil, said second sub-coil positioned linearly adjacent to said first sub-coil and positioned within a single winding plane.

[c15] An imaging system as in claim 13 wherein said plurality of first shield winding turns and said plurality of second shield winding turns are positioned within a single winding plane.

[c16] An imaging system as in claim 9 wherein said shield coil assembly comprises a plurality of winding turns formed in an asymmetrical pattern.

[c17] A method of reducing the fringe field generated by a primary gradient coil assembly comprising:
running a first current through a first gradient shield coil connected in parallel to the primary gradient coil assembly;
and
running a second current through a second gradient shield coil connected in series to the primary gradient coil assembly, said

second gradient shield coil connected in parallel to said first gradient shield coil.

[c18] A method as described in claim 17, wherein said first current is equal to said second current.

[c19] A method as described in claim 17, further comprising:
adjusting said first current and said second current
independently to minimize the fringe field.

[c20] A method as described in claim 17, wherein said first current and said second current are passed through an equal number of winding turns.

[c21] A method as described in claim 17, wherein said first gradient shield coil and said second gradient shield coil share a single winding plane.